



UNITED STATES NAVY

# MEDICAL NEWS LETTER

Rear Admiral Bartholomew W. Hogan MC USN - Surgeon General  
 Captain Leslie B. Marshall MC USN (RET) - Editor

Vol. 30

Friday, 18 October 1957

No. 8

## TABLE OF CONTENTS

Accidental Chemical Poisoning Problem .....	2
SPECIAL NOTICE .....	3
Moniliasis in Pediatrics .....	7
The Tetralogy of Fallot .....	9
Chronic Progressive Pulmonary Histoplasmosis .....	11
Fluid and Electrolyte Disturbances in Heart Failure .....	13
Treatment of Fractures of the Hand.....	15
Vertebral Arteriography in Study of Hemorrhage .....	16
Clinical Pathology - International Workshop .....	18
Gilbert's and Dubin-Johnson Syndromes .....	18
Accreditation of Hospitals .....	19
The Medical Officer Aboard Ship .....	20
433,000 Ambassadors .....	20
From the Note Book .....	21
Navy Nurse Candidate Program .....	22

### DENTAL SECTION

ADA Approves Periodontic and Prosthodontic Residencies.....	23
Gains and Losses of Regular Navy Dental Corps.....	23
ADA 98th Annual Session in Miami .....	25

### RESERVE SECTION

Commandant's Representatives at Medical Schools .....	27
---	----

### AVIATION MEDICINE SECTION

Aviation Medicine Section of the Bureau of Medicine and Surgery.....	29
Pressure Suit Reports .....	37

### The Accidental Chemical Poisoning Problem

In the United States, accidents are the leading cause of death and disability of persons from 1 to 34 years of age inclusive. Accidents were responsible for 94,000 deaths and 9,000,000 injuries in this country in 1955. Home accidents were responsible for 28,000 deaths; 20% of these deaths occurred in children who were less than 5 years of age. The number of children in this age group who died of accidents in New York City in 1955 was more than three times as great as the number who died of the ten leading communicable diseases combined.

It is estimated that more than 400 children who are less than 5 years of age die each year of chemical poisoning in the United States. This is four times the number of children of this age who die each year of chemical poisoning in England. Twenty-seven (14.4%) children less than 5 years old who died of accidents in New York City in 1955 died as a result of poisoning. Owing to the rapid progress that is being made in science and technology, and owing to the increased number of new drugs and household preparations being introduced, the risk of accidental chemical poisoning is increasing.

Due to the increase in the child population, an increasing number of susceptible persons are being exposed to these potential hazards. As a result, there has been an alarming and continual increase in the incidence of accidental poisoning. This is a major problem of public health significance, and an all-out interdisciplinary effort must be directed toward its solution.

Prior to the establishment of the Poison Control Center, the number of cases reported annually did not exceed several hundred. Since the establishment of this center in March 1955, more than 8000 cases have been reported by physicians and hospitals. Even this alarming number does not tell the entire story and it is still grossly understated because in many cases of accidental poisoning the condition is not recognized or is diagnosed erroneously. If the symptoms are not severe and are amenable to first-aid measures in the home, the episode usually is not reported by the physician or the family. In the main, the reports do not include such therapeutic hazards as overdosage, reactions, and complications.

During 1956, 5014 cases of poisoning were reported to the Poison Control Center. The individual products responsible for the poisoning in these cases comprised several hundred. Some products included as many as 12 different brands. Four thousand, four hundred and sixty-nine of the 5014 cases were reported in the first 11 months of 1956. The present article is based mainly on a review of this group of 4469 cases.

The age of the patients was known in 4327 of the 4469 cases. In 2340 (54%) of the 4329 cases, the patients were known to be less than nineteen years of age. Of the patients in these 2340 cases, 735 (31%) were less than two years old, 742 (32%) were two years old, and 328 (14%) were three years old. Therefore, 1805 (77%) of the 2340 patients were less than four years old.



SPECIAL NOTICE

TO ALL ADDRESSEES (EXCEPT U. S. Navy and Naval Reserve personnel on ACTIVE DUTY and U. S. Navy Ships and Stations).

Existing regulations require that all Bureau and office mailing lists be checked and circularized at least once each year in order to eliminate erroneous and duplicate mailings.

It is, therefore, requested that EACH RECIPIENT of the U. S. Navy Medical News Letter, (EXCEPT U. S. Navy and Naval Reserve personnel on ACTIVE DUTY, and U. S. Navy Ships and Stations) fill in and forward immediately the form appearing below if continuation on the distribution list is desired.

Failure to reply to the address given on the form by 15 December 1957 will automatically cause your name to be removed from the files. Only one (1) answer is necessary. Please state the branch of the Armed Forces (if any) and whether Regular, Reserve, or Retired. Also, please write legibly. If names and addresses cannot be deciphered, it is impossible to compare them with the addressograph plates.

Editor

---

(Detach here)

Chief, Bureau of Medicine and Surgery  
Navy Department, Potomac Annex  
Washington 25, D. C.

\_\_\_\_\_  
(date)

I wish to continue to receive the U. S. Navy Medical News Letter.

Name

or

Activity

Ret

or (Print or type, last name first) (rank, service, corps)

Civilian Status

Address

(number)

(street)

City

Zone

State

\_\_\_\_\_  
(Signature)

(Please print clearly. Only one answer is necessary.)





The high incidence of poisoning in children who are two years or less of age may be attributed to the particular stage of growth and development of children of this age. These children are avid explorers and "moutherers." Their poisoning frequently is the result of exposure of toxic agents in an unsafe place in the home of an inexperienced person. As children become older they become more cautious and there is a striking decrease in the incidence of poisoning. Two-year old children who are particularly mobile and are able to climb to high places, such as medicine cabinets, bureaus, television sets, and other storage places, frequently are victims of poisoning by drugs intended for internal administration. As a result, there is a close relationship between the accessibility of toxic agents and the occurrence of poisoning.

Previous reports have indicated that the incidence of poisoning is higher among boys than it is among girls and that it is higher among non-white children than it is among white children. The results of the epidemiologic study reported in the present article confirm these findings. The higher incidence among nonwhite children is most likely attributable to social and economic conditions, such as poor housing and overcrowding rather than to any constitutional difference.

Although more than 200 different substances were responsible for the poisoning in the entire group of 4469 cases, five substances accounted for the poisoning in 34% of the 2340 cases in which the patients were known to be less than nineteen years old.

Drugs intended for internal administration were responsible for the poisoning in 2421 (54%) of the entire group of 4469 cases, and in 895 (38%) of the 2340 cases in which the patients were known to be less than nineteen years old. Aspirin was responsible in 567 of the entire group of 4469 cases. Flavored baby aspirin was a very common cause of poisoning.

Barbiturates were the cause of the poisoning of 70 children who were less than nineteen years old, and two of the children died. The unwarranted claims of manufacturers of nonbarbiturate sedatives and tranquilizing agents and the indiscriminate use of such drugs constitute a grave potential hazard, because the drugs frequently are readily accessible to children in the home. During 1956, about 100 cases of poisoning by tranquilizing drugs were reported to the Poison Control Center, whereas only 12 such cases were reported in 1955.

Household preparations were the cause of poisoning in 609 (26%) of the 2340 cases in which the patients were known to be less than nineteen years old. Bleaching agents were the most frequent offenders in this category. Two-year old children were the most frequent victims of poisoning by household preparations.

Bleaching agents were the cause of poisoning in 125 (6%) of the 2340 cases in which the patients were known to be less than nineteen years old. Creepers and toddlers were the chief victims of poisoning by these agents. Lye was responsible for the poisoning in 52 cases in which the patients were

known to be less than nineteen years of age. Children who were less than four years old were most susceptible to poisoning by this agent. In 40 (77%) of the 52 cases, the children were less than four years old. Naphthalene poisoning is encountered regularly, particularly during the summer months. In 419 (9%) of the 4469 cases, the poisoning was due to drugs intended for external use. In 1094 (47%) of the 2340 cases in which the patients were known to be less than nineteen years old, the poisoning was caused by medicine intended for internal or external use.

Oil of wintergreen is a frequent cause of poisoning and caused death in three cases in this series. Cosmetics were responsible for poisoning in 112 cases.

One hundred and eleven cases of lead poisoning were reported. In 94 of the 111 cases, the diagnosis of lead poisoning was confirmed by the Bureau of Preventable Diseases. In 103 of the 111 cases, the patients were less than nineteen years old. Only 21 (22%) of the 94 children were white; the remaining 73 (88%) were Negroes or Puerto Ricans. This is in marked contrast to the general population of New York City which is 75% white. Incidentally, in all of the 94 cases, the history revealed that the affected children had chewed flakes of plaster or paint peelings. In such cases, the poisoning is due to inadequate adult supervision or to a lack of awareness of adult members of the family about the harmful effects of lead.

The storing of potentially hazardous substances in household utensils was a contributory cause of the poisoning in many cases. Oil of wintergreen, carbon tetrachloride, kerosene, benzene, turpentine, ammonia, furniture polish, and insecticides and rodenticides were stored in saucers, drinking glasses, soda bottles, mayonnaise jars, coffee cans, milk bottles, and fruit jars. In more than 50% of the cases in which the poisoning was due to bleaching agents, solvents, ammonia, and insecticides and rodenticides, these substances were not in their original containers when the poisoning occurred.

The evil practice of hospital pharmacies of dispensing drugs in small collapsible cardboard containers also is responsible for many instances of poisoning. In addition, these containers do not show the name of the hospital, the name of the drug, or any caution regarding its administration. They merely contain instructions for the patient to take one tablet or one teaspoonful every 3 or 4 hours. This insidious practice makes identification of the toxic agent difficult and thus delays prompt and appropriate treatment.

Other hazards found in the home by public health nurses included defective plumbing, defective gas appliances, gas odors, peeling of plaster and paint, vermin, broken windows, and unguarded windows. Such hazards were found in more than 25% of the homes visited. Whether this incidence of such hazards is higher than among the general population is not known.

In addition to these hazards, this epidemiologic investigation disclosed other public health problems, such as pregnancy without prenatal care, lack of health supervision of infants and children, emotional and



mental problems, tuberculosis, and other chronic diseases without needed medical care, and a host of other conditions which at times were far more important than the original accident for which the visit of the public health nurse was made.

The results of the epidemiologic study on which this article is based indicate that accidental chemical poisoning of children is preventable if ordinary safety precautions are employed in the handling, use, and storage of drugs and toxic household preparations.

Accidental chemical poisoning is due to many causes. Seemingly unrelated factors also may be implicated. The problem is very complex and involves both human and environmental components. The successful solution of this problem requires the coordinated action of physicians, public health workers, pharmacists, engineers, pharmacologists, industrialists, nurses, chemists, sanitary workers, lawyers, housing authorities, law enforcement officers, and social workers. Education is very important. Although the task is a formidable one and many gaps in knowledge still exist, maximal advantage must be taken of the knowledge that is available. The problem could be greatly ameliorated if the available knowledge were more widely utilized. (Jacobziner, H., *The Accidental Chemical Poisoning Problem: Postgrad. Med.*, 22: 283-296, September 1957)

\* \* \* \* \*

### Moniliasis in Pediatrics

This report correlates briefly the different disease forms of moniliasis in pediatrics and presents a few ideas about the pathogenicity of the causative agent of thrush.

Moniliasis (candidiasis) is caused by yeast-like organisms of the genus *Candida*. *Candida albicans* is most frequently responsible for human pathology, but other species (*C. tropicalis*, *C. pseudotropicalis*, *C. krusei*, *C. parapsilosis*, *C. guilliermondi*) have been reported as causing human disease which at times terminated fatally.

As are many other microorganisms, these fungi are facultative pathogens and are widely distributed among apparently normal healthy persons. These carriers may remain symptomless for the lifetime. If the proper kind of physiological disturbance occurs in the host, however, the equilibrium is upset and latent infection evolves into overt disease.

Bacterial microorganisms, mainly streptococci and staphylococci, are often found together with *Candida* in cultures or in autopsy material from thrush lesions. Often, it is difficult to decide which organism is primarily responsible for the lesion. Undoubtedly, some lesions which are primarily caused by bacterial microorganisms may become secondarily infected by *Candida* and may eventually assume clinical characteristics of

monilial lesions. In other instances, lesions primarily due to the fungus may become infected with bacteria.

The disease forms range from the most benign cases lasting a few days and comprising the majority, to acute disseminated cases occurring mostly in infants and terminating fatally within days or weeks. Older children and adults may be afflicted with the most bizarre symptoms and may die after many years of chronic or recurring disease.

A dissemination of the infection from the site of primary invasion (usually in the mouth) may occur directly by continuity, but the fungus may spread further from secondary sites by the way of the blood stream and lymphatics.

Moniliasis may start at any age from an endogenous or exogenous source, but the first appearance of the disease probably occurs more often during neonatal life or early infancy than at any other age. At times, latent infection or clinical disease may remain present for years. The effects may be projected into adolescence and beyond. The symptoms, however, may, and usually do, disappear spontaneously or as a result of treatment at any point, especially before dissemination sets in. Superficial cutaneous moniliasis is—with the exception of oral thrush—the commonest early symptom accessible to physical examination. This dermatitis of the newborn seems to be common, especially in the lower economic group of the population. Bound found an incidence of almost 3% in the first 6 months of life. A surprisingly high incidence of 35% in hospitalized infants less than 1 month old was recently reported from Germany.

Clinical diagnosis can be made with considerable accuracy. Many cases, however, are diagnosed as simple diaper rash, infantile eczema, or at times, ringworm. Because of its apparent frequency, cutaneous moniliasis should always be considered in differential diagnosis of diaper rash.

Moniliasis may be caused by any species of *Candida*, but is usually caused by *C. albicans*. The disease forms may range from transient benign stomatitis—comprising the majority—to generalized fatal cases. Dissemination occurs by continuity and by way of the blood stream and lymphatics.

Skin lesions in infants are more superficial and usually cover larger areas than those in older children. Moniliasis seems to be the cause of perianal dermatitis in newborn infants more frequently than is generally realized. Depigmentation occurs in Negroes. Extension by continuity may result in the formation of pseudomembranes in the esophagus, ulcers and perforation of the intestine or in pulmonary lesions.

Severe postprandial vomiting, diarrhea, toxic appearance, shock with hypothermia, and hepatosplenomegaly may suggest systemic moniliasis due to hematogenous spread. This disease form usually runs an acute, frequently fatal, course in infants. A history or symptoms of superficial involvement of the mucous membranes and skin may often help in reaching the diagnosis in such cases. Abscesses in practically any part of the body may be found on autopsy. A lymphocytosis may accompany extensive



moniliasis in infants and young children. Because of lack of specific macroscopic features, systemic moniliasis may pass unrecognized at autopsy unless histological examination is undertaken.

Candida infections beyond infancy have usually a more chronic course and often represent a continuation of infantile moniliasis. The site of predilection for cutaneous lesions is the face and the extremities. Cutaneous granulomas, abscesses, and localized granulomatous and necrotic organ lesions, as well as meningitis, may develop in cases of long standing. Hypoparathyroidism, adrenal cortical insufficiency, retarded growth and development, and alopecia have been reported in children with chronic moniliasis. Allergic reactions to the presence of Candida include candidids, secondary sterile skin lesions, and asthmatic symptoms. Acrodermatitis enteropathica strongly resembles chronic widespread moniliasis. *C. albicans* is usually isolated from patients with this disease.

Preparation of a filterable toxic extract of Candida is reported.

*C. albicans* may be frequently found in the oral cavity and feces of infants, at times without causing clinical lesions. It is almost never present on normal skins or in skin disorders of other etiology.

Maternal monilial vaginitis, contaminated hands and objects, and airborne infection are some of the sources of moniliasis in infants. Intra-uterine infection may also occasionally occur. Infection from endogenous foci, e.g., in the gastrointestinal tract, as well as exogenous sources, is responsible for disease beyond infancy. Familial incidence of moniliasis has been noted. Factors predisposing to thrush are listed.

Nystatin is superior to other therapeutic agents in many forms of moniliasis. Oral administration of the antibiotic in infancy and children should always accompany any topical applications, because many patients have foci of infection in the gastrointestinal tract. Treatment of pregnant women with monilial vaginitis might prevent thrush in newborns. Isolation of infants with thrush is advisable. (Dobias, B., Moniliasis in Pediatrics: J. Dis. Chil., 94: 234-246, September 1957)

\* \* \* \* \*

### The Tetralogy of Fallot

In the 69 years since the classical description of the tetralogy of Fallot a "characteristic" clinical picture has evolved. The wide variability of this syndrome, however, is not generally known, but is dependent upon the severity of the anatomical defects and fluctuating functional reactions of each patient.

This report discusses some "unusual" clinical manifestations of this complex which are illustrated by short case histories. The material is drawn from only 32 cases, emphasizing that such findings are not rare. The

diagnosis was verified in all but two by at least two of the following methods: (1) cardiac catheterization, (2) angiocardiology, (3) operation, (4) autopsy. Patients were selected partially by the adequacy of the clinical data. History, physical examination, x-rays, fluoroscopy, electrocardiograms, and routine laboratory work were available in all. Twenty-five were examined by at least one of the authors. Phonocardiograms, cardiac catheterization, and operative findings were available in 17. Six were autopsied.

The primary goal of medical therapy is to maintain health in anticipation of surgery at a suitable age. Operation should be performed before complications develop; on the other hand, the approach of truly "curative" operations by directly attacking the pulmonic obstruction and closing the septal defect demands a more discriminating use of the palliative procedures until these techniques are perfected. Deterioration, however, may be surprisingly rapid. Even the mildest cases should be closely observed for increasing arterial unsaturation, polycythemia, heart size, hypertension, congestive failure, syncope, convulsions, or thrombotic episodes. These demand immediate surgery, because a shunt operation may be the safest way of carrying the patients into the new surgical era.

Thirty-two cases of the tetralogy of Fallot are reviewed; a surprisingly wide range of clinical manifestations is compatible with the diagnosis. Many of these variants, not previously stressed, have been illustrated by case material. The most important conclusions are listed.

Both the intensity and age of onset of cyanosis are extremely variable and appear to be prognostically important. Some of the numerous factors influencing cyanosis in this disease are discussed. It is emphasized that the acyanotic tetralogy is not a rarity.

Accentuated atrial waves were seen and recorded from the jugular vein in five instances. A syndrome of hypertension, left ventricular hypertrophy, congestive failure, and pronounced cardiomegaly were seen in six children. At least five of these children are dead. Infundibular stenosis was implicated in the majority. Transient hypertension may also occur postoperatively.

Murmurs apparently may arise from either the obstructed pulmonary artery, the septal defect, or both locations. Auscultation and phonocardiography, however, reveal no "diamond-shaped" murmurs typical of isolated pulmonary stenosis, but rather an early decrescendo murmur with infundibular and a late crescendo systolic murmur with valvular stenosis. Absence of murmurs suggests pulmonary atresia. Continuous murmurs arising from dilated bronchial arteries and parasternal diastolic murmurs of uncertain genesis are occasionally found.

Increased cardiac transverse diameter does not necessarily indicate additional anomalies. It may only reflect hypertension or severe infundibular stenosis. The "coeur en sabot" represents the minority of cardiac



silhouettes, usually occurring only in early childhood. Identifiable and even prominent main pulmonary arterial trunks are sometimes seen and suggest valvular pulmonic stenosis. Approximately 25% of x-rays in this series reveal normal or increased vascular markings. Pulmonary blood flow may be low, normal, or even increased.

Hypertrophy of the right ventricle may be so concentric that its fluoroscopic shadow is not distorted. The ECG, however, consistently indicated hypertrophy. Physical examination was also very reliable in this respect.

The direction and magnitude of the transeptal shunt is controlled by the relative resistance to pulmonary and aortic outflow. Factors influencing these variables and the role of this concept in medical management are discussed. (Holladay, W.E. Jr., Witham, A.C., The Tetralogy of Fallot - The Variability of Its Clinical Manifestations: Arch. Int. Med., 100: 401-411, September 1957)

\* \* \* \* \*

### Chronic Progressive Pulmonary Histoplasmosis

Histoplasmosis was still considered a rare disease in 1945. The name Histoplasma capsulatum, had been given to round or oval bodies found in the endothelial cells of certain cases of splenomegaly by Darling in 1906. DeMonbreun, in 1934, isolated the organism from a clinical case and proved it to be a fungus. Hodgson and associates summarized 138 cases of histoplasmosis in 1950.

In spite of all reports, and even though the clinical spectrum of histoplasmosis has greatly expanded, further knowledge of the disease is mandatory. It is well accepted that the disease may be acute, chronic, latent, or recurrent. All organs of the body may be involved. The types of illness vary from an asymptomatic group to the severe generalized fatal forms. Somewhere between these two groups there is chronic progressive pulmonary histoplasmosis closely resembling the reinfection type of tuberculosis and now considered to be reinfection histoplasmosis. The present treatment of this form of histoplasmosis is similar to that of pulmonary tuberculosis before specific therapy became available.

This report demonstrates the wide variety of pathologic pulmonary manifestations which may occur with this disease, and illustrates how bronchogenic carcinoma, pulmonary tuberculosis, bronchiectasis, and empyema must be excluded in the differential diagnosis.

The greatest problem has been the diagnosis when positive cultures were absent. Few diseases present as many obstacles to establishing an absolute diagnosis as histoplasmosis. In spite of positive skin reactions and positive complement fixations, no case has been considered proved until the



organism has been cultured from the sputum or demonstrated in the body tissues. Serologically proved cases are not included in this report.

Pulmonary resection, as reported by the authors and several others, appears to offer the most definite, if not the only, method for successful therapy in pulmonary histoplasmosis. The effects of medical therapy have been disappointing in all forms of histoplasmosis and perhaps have contributed no more than is achieved by rest treatment or by the natural tendency of the disease to heal itself. New medicinals, such as Amphotericin B., continue to be used; one may expect that adequate medical therapy will be established within the next few years.

The most definite indication for surgery is a localized lesion. Focalized coin lesions present no problem regardless of the type of resection employed. Cavitory histoplasmosis, with or without tuberculosis, has constituted the largest number of surgical specimens in the present study. The authors believe that lobectomy is the resection of choice, although several segmental resections have yielded excellent results. From the reported case reports, the authors believe that a person weakened by histoplasmosis and remaining in a hospital for the tuberculous, with or without a diagnosis of tuberculosis, should receive adequate antituberculous therapy prior to, and following, resections.

Undiagnosed pulmonary lesions often warrant early thoracotomy, but each case must be individualized.

The role of collapse therapy in histoplasmosis still remains unsettled. Few surgeons have had experience enough with this little known disease to establish the indications for thoracoplasty or plombage. Thoracoplasty prior to resection may well be indicated in an attempt to stabilize the disease prior to resectional procedures.

Bronchial stenosis, bronchiectasis, cystic changes in the lung, middle lobe syndrome, and large solid undiagnosed lesions are accepted indications for surgery regardless of the etiology of the disease, if the patient's clinical condition warrants it. Because of the difficulty in proving a diagnosis of pulmonary histoplasmosis, the authors have frequently operated on such a basis. Results in these undiagnosed cases suggest that resection can be employed as safely as for other pulmonary disease.

The histoplasmin skin test was positive in the majority of these cases (19). In 10 cases, there were positive tuberculin skin tests. The authors believe that the intensity of the skin reaction is especially significant; it is recommended that serologic studies be made prior to the administration of the skin test. If a patient's x-ray studies show a disease process resembling tuberculosis, and if he presents a positive histoplasmin skin test, but a negative tuberculin skin test, they consider this a case of pulmonary histoplasmosis instead of tuberculosis until otherwise proved. (Polk, J. W., Cubiles, J. A., Buckingham, W. W., *Surgical Treatment of Chronic Progressive pulmonary Histoplasmosis: J. Thoracic Surg.*, 34: 323-340 September 1957)



### Fluid and Electrolyte Disturbances in Heart Failure and Their Treatment

Advances in the understanding of fluid and electrolyte disturbances in congestive heart failure have at the same time increased therapeutic effectiveness and engendered new problems and new complications related to more vigorous therapy. The physician who treats patients with heart failure should be cognizant of both the advantages and the dangers associated with these developments. This presentation delineates the current status of knowledge of fluid and electrolyte disturbances in heart failure and translates this knowledge—obtained largely by laboratory techniques—to its practical application at the bedside.

Heart failure is associated with a variety of electrolyte disturbances, some of which are attributed to the effects of intensive or excessive use of therapeutic agents or to gastrointestinal, renal, or pulmonary disturbances associated with heart failure. These electrolyte disturbances may themselves be responsible for serious clinical symptoms and may also render the heart failure intractable and unresponsive to therapeutic agents, particularly the mercurial diuretics. Consequently, there has been great emphasis in recent years on the avoidance of these electrolyte disturbances, especially on their recognition and correction when they occur.

On the other hand, it has been stressed that the fundamental electrolyte disturbance in heart failure is the abnormal retention of sodium and that the dramatic improvement in the outlook of patients with heart failure in recent years has been due to correction of this abnormality by a more effective use of low sodium diets and mercurial diuretics. The current emphasis on the hazards of electrolyte disturbances in heart failure due to therapeutic agents has been so intense that many physicians have become excessively cautious in their use of low-sodium diets and mercurial diuretics, thus foregoing a major therapeutic advance in the management of heart failure.

Considering the number of patients with heart failure and the usually long life history of heart failure, serious electrolyte disturbances are relatively infrequent and usually occur only in advanced states of the disease. With proper understanding of blood electrolyte patterns in heart failure and with reasonable caution, it is possible to avoid serious electrolyte disturbances without surrendering the advantages of sodium restriction and mercurial diuresis fully utilized for maximum therapeutic effect. When a patient with heart failure becomes refractory to treatment, an electrolyte disturbance must be considered as one among many possible causes. But, hypertonic sodium chloride should not be hastily administered unless all of the more frequent causes of intractable heart failure have been carefully excluded and the presence of sodium depletion definitely established by the clinical history and detailed study of the blood electrolyte pattern.

It is becomingly increasingly apparent that the unfavorable clinical picture associated with electrolyte disturbances is usually not due to these electrolyte disturbances. Rather, the clinical picture and the electrolyte aberrations are both consequences of the inexorable progression of the serious underlying cardiac disease and its complications. As a rule, a careful reappraisal and improvement in therapy and the elimination of complications are more likely to correct both the heart failure and the electrolyte disturbances than the intravenous administration of electrolytes designed to correct a chemical abnormality.

However, electrolyte disturbances have usually been of primary responsibility for the clinical picture under the following circumstances: repeated removal of pleural or ascitic fluid or profuse mercurial diuresis, especially in hot weather, may lead to true sodium depletion with hyponatremia, muscular cramps, and a shock-like state. In such cases, cautious sodium replacement is necessary and beneficial. This does not apply to the more common form of dilution hyponatremia in which neither muscle cramps nor shock occurs and in which there is no satisfactory diuresis or other cause for sodium depletion.

Electrolyte disturbances are also clinically significant in the cases of ammonium chloride acidosis. These can usually be avoided by using ammonium chloride only intermittently, in moderate dosage, and not in the presence of renal or hepatic insufficiency. This clinical state is readily controlled if its nature is recognized early. Hypochloremic alkalosis may be avoided if mercurial diuretics are given as required and not with unnecessary frequency. Furthermore, ammonium chloride should be supplied intermittently whenever mercurial diuretics are given frequently and are followed by a profuse diuresis.

Potassium depletion is perhaps the commonest electrolyte disturbance in heart failure that is frequently overlooked. This may not be reflected in serum potassium determinations. When anorexia and nausea prevent an adequate intake of potassium and, especially when there is associated diarrhea—which is often overlooked in practice—potassium depletion is likely to be present, especially because both the heart failure itself and many of the drugs used contribute to potassium depletion. This depletion can be avoided only by a constant check on the adequacy of potassium intake in the diet and by more than casual query as to bowel function. (Friedberg, C.K., Fluid and Electrolyte Disturbances in Heart Failure and Their Treatment: Circulation, XVI: 437-458, September 1957)

\* \* \* \* \*

Please forward requests for change of address for the News Letter to: Commanding Officer, U.S Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.



### Treatment of Fractures of the Hand

This article presents problems encountered in dealing with a series of 119 cases and 170 fractures of the hand encountered at the City of Detroit Receiving Hospital and 142 cases encountered in private practice.

In the series of 142 cases, the ages varied from 2-1/2 months to 86 years. There were 107 males and 35 females. Etiological factors were many and varied. Heavy punch presses and large machine accidents caused the most serious injuries. Farm accidents, automobile injuries, and so on, all are agents in causing these injuries.

The majority of fractures were seen primarily. The cases that were seen secondarily had some complicating factor and were referred because of this condition. Twenty-eight fractures involved more than one bone; nine were severe crushing injuries that required multiple procedures. Joint dislocations with or without fracture of the adjacent bone gave considerable difficulty. Dislocated distal interphalangeal joints usually had considerable soft-tissue injury, especially to the extensor tendon mechanism. Proximal interphalangeal joints, especially those involving old injuries, usually had a good deal of residual stiffness.

Complications noted in the old injuries were nonunion, malunion, rotation, infection, adhesions of both flexor and extensor tendons, ankylosis of the joints, and causalgia. Treatment is outlined in a table. Attempts were made to handle these fractures in the simplest possible way. For example, if a simple fracture could be reduced by merely flexing the involved digit over a curved metal splint, this was done. When indicated, traction was applied either in the soft tissues or in the bone. Only rarely was it felt necessary to do an open reduction on a simple fracture. Attempts were made to immobilize only the finger involved. This was to prevent stiffness of the other digits. The universal metal splint was used to good advantage in severe crush injuries and in multiple fractures. The authors did not hesitate to use small Kirschner wires in the reduction of many of these fractures in open wounds. They saw no untoward reaction to these wires, and they usually facilitated early motion of the uninjured fingers.

The majority of complications encountered were in those injuries that were seen late. Malunion and nonunion, with rotation of the distal fragments, were encountered all too often in these old fractures. These complications were treated by open reduction and insertion of Kirschner wires. If union was not complete, it was possible to refracture the injured area, rotate the fragments to normal position, and place small Kirschner wires. If union was complete, it was necessary to do an osteotomy. Once the osteotomy was completed, the fragments were rotated into position and maintained in that position by small Kirschner wires and allowed to heal. Some surgeons use small bone grafts with this type of reconstructive surgery with excellent results.



Infection is still occasionally seen in spite of widespread use of antibiotics. In this series, nine infections were seen both in the early and late cases. Two had frank osteomyelitis.

Adhesions commonly appear about the flexor tendons at the site of the callus formation. A tendolysis on the flexor tendons usually results in good functional digits if the tendon has not been injured too severely. If marked scar formation is present, it is better to do a tendon-grafting procedure.

Joint stiffness, especially about the metacarpophalangeal joint, was seen all too frequently, even in patients in whom only one finger had been injured. Capsulectomies were necessary in these cases. Improvement was remarkable in capsulectomies performed about the metacarpophalangeal joint. However, in procedures performed on the proximal interphalangeal joint, results were discouraging.

When fingers were injured too severely, amputations had to be carried out. This was especially true where both the flexor and the extensor tendons had been injured along with the blood and nerve supply to the digits themselves. Some digits, where severe atrophy had occurred and where joint stiffness was marked with subsequent poor tendon function, were also amputated.

Several cases of severe causalgia were also encountered. In these cases, treatment was with cervical sympathectomy, with some improvement. (Zelenock, M. N., Larsen, R. D., Posch, J. L., Treatment of Fractures of the Hand: Arch. Surg., 75: 320-337, September 1957)

\* \* \* \* \*

#### Vertebral Arteriography in Study of Hemorrhage

The understanding and definitive treatment of subarachnoid hemorrhage must necessarily develop with the evolution of effective methods of investigating the cerebral vascular tree. Bilateral percutaneous carotid arteriography has become almost routine practice in the study of subarachnoid hemorrhage. This technique has shown that aneurysms, angiomas, and—very rarely—tumors are responsible for a large percentage of hemorrhages. A significant group remains in which no source for bleeding is found.

This report gives additional information gained by vertebral arteriography. The present series was composed of 60 cases of spontaneous subarachnoid hemorrhage in which bilateral carotid arteriography failed to reveal a source of bleeding. No cases were included in which a posterior lesion was suspected and diagnosed by vertebral arteriography as a primary procedure. The diagnosis was confirmed by lumbar puncture in all cases. In no case was there an apparent hemorrhagic diathesis. None of the patients had suffered craniocerebral injury as part of his illness, so that traumatic subarachnoid hemorrhage is not germane to this group.



Vertebral arteriography was entirely percutaneous via an anterior approach. Difficulties of technique have been largely overcome since adoption of the Sheldon needle. General endotracheal anesthesia was used in the great majority of cases to spare the patient the pain of inadvertent nerve-root irritation by the needle (carotid angiography is routinely performed under local anesthesia).

In 16 cases (26%), vertebral arteriography demonstrated a lesion capable of producing, and assumed to be responsible, for the subarachnoid hemorrhage. Eight of these were aneurysms and eight were angiomas. An analysis of the findings is given in a table.

The series was comprised of 32 males and 28 females ranging in age from 6 to 66 years. Seven patients (11.5%) were under 20 years of age; 36 (60%) were between 20 and 50; and 17 (28%) were over 50 years of age. Nine (15%) of the patients exhibited hypertension as judged by several recordings of diastolic pressure over 90 mm. of mercury. Of the group, 37 (61.5%) retained consciousness while 23 lost consciousness, either initially or early in the course of their illness.

In every case save one, the main symptom was severe headache, usually of abrupt onset. The physical signs were of two types: those caused by contamination of the subarachnoid space with blood; and the signs of focal neurological deficit. Stupor, stiff neck, Kernig's sign—i.e., the manifestations of meningeal irritation—were reported in some degree in all cases. Focal neurological abnormality was present in 15 patients (25%), in 7 (11%) of whom total arteriography had revealed no lesion. Eight (50%) of the pathological group had physical signs. Hemiparesis, hemianopia, facial weakness, and ocular nerve palsy (mainly 3rd and 6th nerves) were common to both groups, as was the occasional finding of retinal hemorrhages.

The number of angiomas and aneurysms discovered by vertebral arteriography was surprisingly high. Walton, summarizing many published reports including postmortem material, felt that 15% of aneurysms were in the vertebral-basilar system. McKissock and Walsh, and Falconer reported posterior aneurysms as occurring in 3 to 6% of their clinical series. Angiomas of the brain stem and cerebellum have been considered quite uncommon.

Vertebral arteriography should be undertaken when bilateral carotid arteriography fails to show a source for subarachnoid hemorrhage. Vertebral arteriography may show a surgically accessible lesion. If total study is negative, the physician can more securely offer the patient a good prognosis. Both posterior cerebral arteries must be filled to exclude supratentorial angiomas and aneurysms. (Spatz, E. L., Bull J. W. D., Vertebral Arteriography in the Study of Subarachnoid Hemorrhage: J. Neurosurg., XIV: 543-547, September 1957)

\* \* \* \* \*



### Clinical Pathology

The first international "workshop" in clinical pathology was held in London on July 9, 1957, at the Royal Army Medical College, Millbank. This was the first extension to Europe of the workshop idea which originated with the American Association of Clinical Pathologists.

The Director, F. William Sunderman, introduced the workshop, himself, and was ably assisted by Vernon E. Martens (U.S. Navy) and Arthur Jordan (Sheffield). In the preparation of the workshop the Surgeon General of the U. S. Navy (Rear Admiral B. W. Hogan) gave facilities similar to those provided in the U. S. A., and made available the Navy Department personnel who had assisted in previous workshops. The cooperation of the Director-General, Army Medical Services, assured the workshop of excellent laboratory facilities at Millbank. Dr. M. Lubran acted as Assistant Director, and a number of prominent clinical pathologists from England and the U. S. A. took part as demonstrators.

The subject was Clinical Haemoglobinometry and 62 clinical pathologists participated, ranging in seniority from registrar to consultant. They were taken through all the stages of haemoglobinometry, from the calibration of pipettes to spectroscopy. There is no doubt that they had an excellent survey of present-day practice; and, though British pathologists may have thought that some aspects were oversimplified, the objects of the exercise—to demonstrate the method of the workshop—was fully achieved. The pattern was laid down for future workshops in this country.

The British Association of Clinical Pathologists owes a great debt to Dr. Sunderman and all his collaborators for their intensive preparatory work and their actual efforts on the day. (The Lancet, London, August 3, 1957)

\* \* \* \* \*

### Gilbert's and Dubin-Johnson's Syndromes - Their Significance in Military Medicine

Gilbert's disease (also called congenital hepatic dysfunction) is a benign familial disease characterized by intermittent or chronic icterus which usually has its onset in infancy, childhood, or early adulthood. The icterus usually manifests itself in the sclerae and may be accompanied by lassitude, fatigue, dyspepsia, and other functional complaints. Characteristically, exacerbations are induced by stress and this is important diagnostically in that the icterus can be produced or increased by subjecting the patient to strenuous exercise. The serum bilirubin is usually less than 5 mgm%, although values up to 12 mgm% have been reported. The bilirubin is of the indirect reacting variety and hence there is no choluria. The liver



is not enlarged, and biopsy and necropsy specimens have shown no histologic abnormality. The only abnormal laboratory finding is a delayed excretion of bilirubin when the bilirubin excretion test is performed.

Recently, the underlying metabolic defect in this disorder has been clarified (Arias, I. M., London, I. M., Science, 20 September 1957). It has been shown that indirect reacting serum bilirubin is conjugated in the liver with a glucuronic acid radicle from uridine diphosphate glucuronic acid (UDPGA) to become direct reacting bilirubin. Transfer of the glucuronic acid radicle is catalyzed by an enzyme, transferase, contained in the microsomes of the hepatic cells. In patients with Gilbert's disease, there is a deficiency of transferase.

Dubin-Johnson's syndrome (also called Nelson-Sprinz disease) is a benign familial disorder with an excellent prognosis. It is characterized by a hyperbilirubinemia (6-8 mgm%) of which the predominant portion of the bilirubin is the direct reacting variety. The symptoms in this disease are more severe than in Gilbert's disease and include nausea, vomiting, and abdominal pain. Because the hyperbilirubinemia is partly of the direct variety, choluria occurs. The liver may be palpable one to two fingerbreadths below the right costal margin and may be tender. At necropsy or biopsy (the only definitive methods of diagnosis at present), the liver appears black or dark brown and microscopically displays a lipochrome-like pigment in the hepatic and Kupffer cells. The pigment is most concentrated in the hepatic cells around the central vein and becomes less dense towards the periphery of the lobule. BSP, cephalin flocculation, and thymol turbidity tests may give abnormal results. Characteristically, the gall bladder does not visualize when cholecystography is attempted, even with double doses of dye.

In the military, it is particularly important to recognize and label these entities accurately because, otherwise, personnel are separated or retired from the service with a diagnosis of chronic hepatitis, a service connected disability. (LT S. Falbo MC USN, U. S. N. H., St. Albans, N. Y.)

\* \* \* \* \*

#### Accreditation of Hospitals

The attention of all Commanding Officers of Naval Hospitals is directed to the August 1957 bulletin of the Joint Commission of Accreditation of Hospitals, which is reproduced in the Organization Section of the Journal of the American Medical Association of 14 September 1957, page 160. The information contained therein is considered to be most important, and Commanding Officers are requested to comply with the recommendations outlined.

(ProfDiv, BuMed)



### The Medical Officer Aboard Ship

The Medical Officer Aboard Ship, (MN-8265), a twenty-minute training film for and about Navy doctors, has been completed and distribution of prints was made during August.

The purpose of the film is to show young medical officers the variety of their responsibility as sea-going doctors. It is for use at hospitals and fleet indoctrination points and all other places where medical officers prepare for their first sea duty. Also, it is recommended for use by Offices of Naval Officer Procurement in their program conducted in cooperation with civilian medical schools.

Using Navy personnel throughout, the film illustrates the conception that the medical officer has a five-way job when he goes to sea: He is, of course, first of all a clinician; but then he is also an administrator, the head of a department; he is a preventive medicine officer; he is an expert on combat medical matters; and he is a teacher. Linking these specific ideas, the film carries an across-the-board implication that the medical officer is also an adept in interpersonal relations. He is a busy man; but as the picture makes clear, he has some time left for fun and for the pursuit of personal professional interests.

CDR Charles L. Waite MC USN, U. S. N. H., Bethesda, Md., plays the part of the medical officer. The picture was photographed aboard USS CANBERRA (CAG-2), CAPT Charles Mauro commanding, and includes many of the officers and men of the cruiser as actors in their real-life assignments.

Prints of The Medical Officer Aboard Ship have been distributed to Naval Hospitals and Naval District Training Aids Sections and Libraries from which they may be borrowed for appropriate use. If not so available, inquiry may be addressed to Film Distribution Unit, Training Division, Bureau of Naval Personnel, Department of the Navy, Washington 25, D. C.

\* \* \* \* \*

### 433,000 Ambassadors

The President has called upon all Americans to participate in a People-to People Program—an effort to increase understanding between Americans and people of other lands in the interests of world peace.

In letters being distributed to each member of the Armed Forces now stationed overseas or on a ship touching foreign ports, the President states, "Servicemen and women are the largest group of official U. S. personnel stationed in foreign countries. As a result, people form their personal attitudes toward our country and our American way of life to a great extent by what they see and hear about American service personnel and their dependents."



With over 37,000 Navymen stationed overseas and over 396,000 more on ships, our Navy has over 433,000 ambassadors who can actively participate in the People-to-People Program. (Chinfo Newsletter, 15 September 1957)

\* \* \* \* \*

From the Note Book

1. CAPT C.C. Shaw MC USN, the Medical Officer, Philadelphia Naval Shipyard, Philadelphia Pa., has been promoted to Associate in Medicine on the Faculty of the Medical School of the University of Pennsylvania. This promotion was voted by the Executive Committee of the Faculty of the Medical School because of CAPT Shaw's important activities in the teaching program of the Medical School
2. The catalogue of the exhibit, William Harvey and the Circulation of the Blood, prepared by the National Heart Institute and the National Library of Medicine, may be obtained from the Heart Information Center, National Institutes of Health, Bethesda, Md., upon request. ( PHS, HEW)
3. The following have been added to the teaching materials of the Armed Forces Institute of Pathology:
  - a. New fascicle of the Atlas of Tumor Pathology, Tumors of the Skin, by Herbert Z. Lund, M.D., Price \$3, plus 10% postage fees.
  - b. New study set available for loan, Surgical Pathology, Part II, consisting of 75 microscopic slides with a list of diagnoses.
  - c. Lantern slide set available for loan, X-Ray Signs of Meningiomas, (Radiology), consisting of 100 - 2" x 2" slides.A complete listing of the available lantern slide sets as well as a loan request form may be obtained upon written request. (AFIP)
4. The use of penicillinase in the treatment of hypersensitivity reactions to penicillin is based on the logical knowledge that circulating penicillinase reduces all demonstrable penicillin blood levels to zero for prolonged periods of time, thus rendering the penicillin nonallergenic. When used in 32 cases of moderate to severe hypersensitivity reactions to penicillin, the results of treatment were definitely encouraging and apparently superior to measures previously in standard use. (J.A.M.A., 21 September 1957; LCDR A M. Minno MC USNR, CAPT G.M. Davis MC USN)
5. Systemic scleroderma is a disease of unknown etiology in which fibrillar acellular collagen hardens the skin and constitutes the most prominent manifestation. Other systems may be involved—joints, heart, gastrointestinal tract, kidneys, lungs, and practically every organ in the body containing

- connective tissue. In a small percentage of cases (10%) the initial clinical manifestations are referable to internal organs or tissues prior to the appearance of cutaneous involvement. (Arch. Path., September 1957; M.B. Goldgraber, M.D., J.B. Kirsner)
6. A comprehensive review of hydatid disease covering briefly the life cycle of the parasite and a discussion of the symptoms, sites, and treatment appears in J. Internat. Coll. Surg., August 1957; Y. Tidejian, M.D.
7. Two cases of infection with *Sporotrichum Schenckii* are reviewed. In the majority of cases (83%) infection was limited to the skin and subcutaneous tissues. Diagnosis was readily established by using routine cultural techniques. Response to iodides was prompt and complete. (Ann. Int. Med., September 1957; W.M. Mikkelsen, et al.)
8. A critical review of various data relating to the relative immunity of the American woman to clinical coronary artery disease suggests that this immunity cannot be due entirely to some endocrine-induced protection against the supposed atherogenic properties of a high fat dietary. (Circulation, September 1957; M. Friedman, M.D., R.H. Roseman, M.D.)
9. Infantile cortical hyperostosis is a disease of infancy which is characterized by swellings over bone and by fever, irritability, a remittent course, and characteristic roentgenographic findings. The course is usually benign and the treatment is symptomatic. (Postgrad. Med., September 1957; J.B. Sidbury, Jr., M.D.)
10. This article presents a review of 16 cases of staphylococcal enterocolitis in all of which the patients survived. The pathogenesis of the disease is discussed, especially in relation to cross infection and antibiotic therapy. Suggestions for prevention of the disease are presented. (Arch. Surg., September 1957; D. Lepley, Jr., M.D., M.B. Smith, M.D.)
11. The combination of the radium plaque with tocopherols has been the authors' most effective method of management in the treatment of Peyronie's disease with 84% of the cases cured or markedly improved. (J. Urol., September 1957; E.H. Burford, C.E. Burford)

\* \* \* \* \*

#### Navy Nurse Candidate Program

The Navy announces a new Navy Nurse Corps Candidate Program which will give selected senior college nursing students an opportunity to



join the Navy while continuing their education, and on completion, be commissioned as Ensigns in the Nurse Corps.

The Navy plans to enroll annually a number of nursing students enrolled in fully approved basic collegiate schools of nursing when they begin their senior year. These selectees will be placed in pay grade E-3, and will receive the pay of that grade plus tuition, fees, books, room, and board throughout their senior year. Upon receipt of their baccalaureate degree in nursing, they will be commissioned Ensigns, Nurse Corps, Naval Reserve, with a two-year active duty obligation. Applicants must be between the ages of 20 and 33-1/2 at time of graduation.

For specific information regarding this program, inquiries can be directed to the Director of the Nurse Corps, Bureau of Medicine and Surgery, Navy Department, Washington 25, D. C. (Nursing Division, BuMed)

\* \* \* \* \*

**DENTAL**



**SECTION**

ADA Approves Periodontic and Prosthodontic  
Residencies at Treasure Island

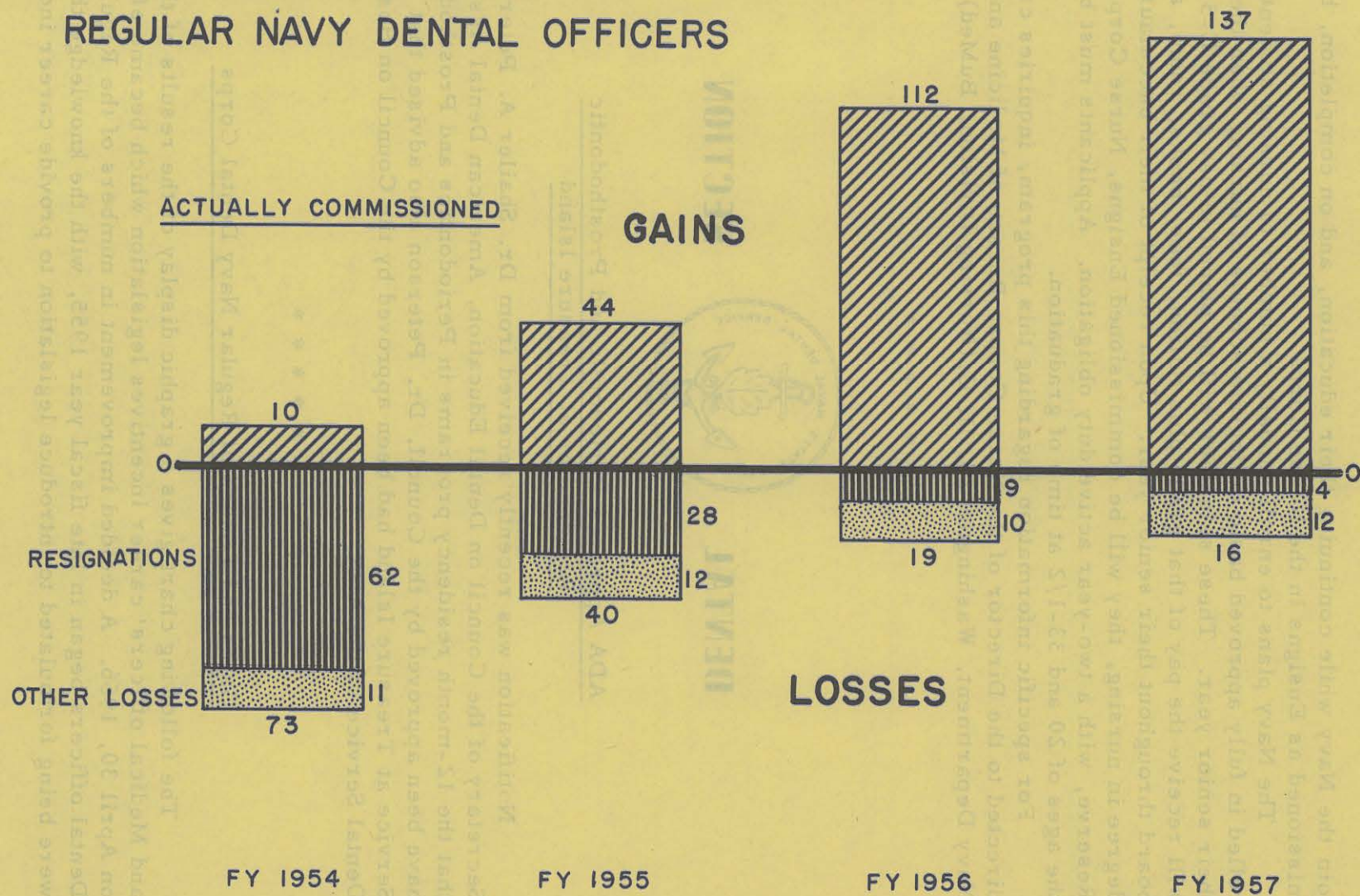
Notification was recently received from Dr. Shailer A. Peterson, Secretary of the Council on Dental Education, American Dental Association, that the 12-month residency programs in Periodontics and Prosthodontics have been approved by the Council. Dr. Peterson also advised that the Dental Service at Treasure Island had been approved by the Council on Hospital Dental Service of the ADA.

\* \* \* \* \*

Gains and Losses of Regular Navy Dental Corps

The following chart gives a graphic display of the results of the Dental and Medical officers' career incentives legislation which became effective on April 30, 1956. A decided improvement in numbers of the Regular Navy Dental officers began in late fiscal year 1955, with the knowledge that plans were being formulated to introduce legislation to provide career incentives.

# U.S. NAVAL DENTAL CORPS "OPERATION BUILD-UP" REGULAR NAVY DENTAL OFFICERS





ADA 98th Annual Session - Miami  
4 - 7 November 1957

"Mr. Disaster" will be a silent member of a team of two Dental officers of the U. S. Naval Dental School, National Naval Medical Center, Bethesda, Md., who will present a demonstration on the emergency care of mass casualties at the annual meeting of the American Dental Association. Captains J. V. Niiranen and H. B. Towle will discuss problems associated with disaster casualties and the dentist's potential usefulness as a member of the casualty treatment team. "Mr. Disaster," a lifelike manikin, will enable the essayists to demonstrate realistically the procedures which dentists must be prepared to accomplish if minimum casualty treatment requirements are to be met in event of disasters, such as hurricanes, floods, or atomic blasts.

Captain F. L. Losee DC USN, Lieutenant Commander P. J. Boyne DC USN, and Commander H. W. Lyon DC USN will present projected clinics on anorganic bone grafts, portraying a research study conducted at the Naval Medical Research Institute. Captain F. E. Jeffreys DC USN will participate in a panel discussion and present a table clinic on occlusion and the temporomandibular joint. Captain R. B. Wolcott DC USN, who is Secretary of the American Academy of Gold Foil Operators, will present a table clinic on the simplified class V gold foil restoration.

Reserve Dental officers will receive retirement point credit for attendance at approved clinics and lectures during the session. These include:

Panel discussions: High-speed cutting instruments - advantages and problems

X-radiation in the dental office

Current status of drugs in dentistry

Indications for, and the use of, the various restorative materials

Round table discussion: The partially edentulous patient; diagnosis, treatment planning, and treatment

Clinical lecture: The dentist's role in disaster casualty care

Individual essays: Oral surgery

\* \* \* \* \*

# DENTAL OFFICERS APPOINTED IN THE U.S. NAVY\_

DURING PERIOD  
1 JULY 1957 TO  
1 SEPTEMBER 1957

PAUL L. J. BRADFORD

CLYDE L. FULCHER

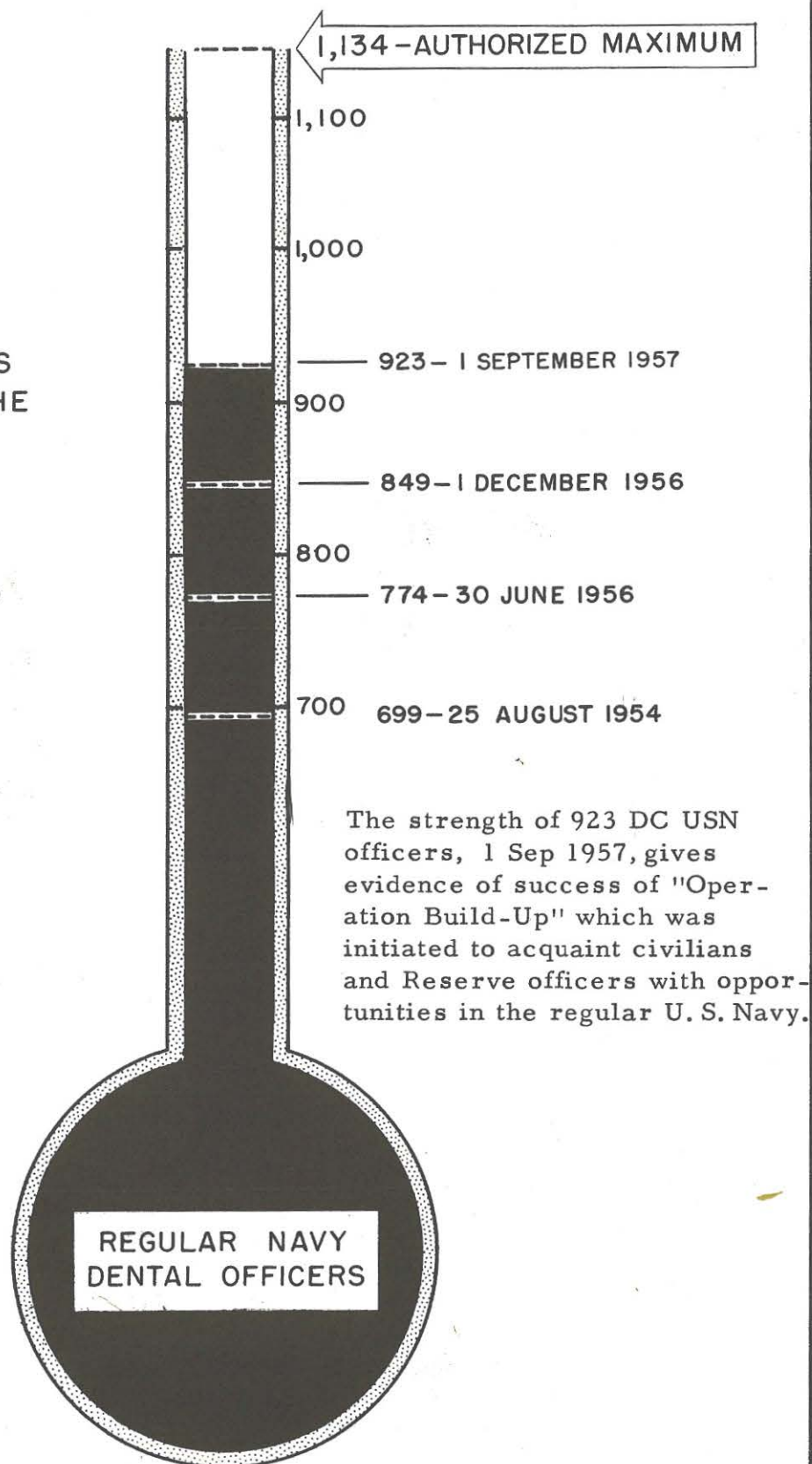
CHARLES J. GRADY

JOHN P. KELLEY

WILLIAM A. STOUT

VAN R. TIBBETTS

WILTON G. WOODY



The strength of 923 DC USN officers, 1 Sep 1957, gives evidence of success of "Operation Build-Up" which was initiated to acquaint civilians and Reserve officers with opportunities in the regular U. S. Navy.





## RESERVE SECTION

### Commandant's Representatives at Medical Schools

The majority of approved medical schools in the United States have a Commandant's Representative on the teaching staff of the school. He is an inactive Reserve Medical Department officer who has been issued appropriate duty orders by the Commandant of his naval district for the purpose of disseminating essential information to individuals interested in the Navy's Medical Reserve Program. He is especially important to the undergraduate medical student who wants to know more about the Navy's training program in the fields of medicine.

Commandant's Representatives are serving at the following medical schools and universities:

Boston Univ. School of Medicine  
 Tufts College  
 Dartmouth Medical School  
 Jefferson Medical College  
 Pennsylvania, University of  
 Georgetown University school of  
 Medicine  
 Bowman Gray School of Medicine  
 South Carolina, University of  
 Alabama, University of  
 Miami, University of (Florida)  
 Tulane University  
 Oklahoma, University of  
 Wayne University (Detroit)  
 Northwestern University  
 Harvard University  
 University of Vermont, College of  
 Medicine  
 Hahnemann Medical College  
 Temple University  
 Medical College of Virginia  
 West Virginia School of Medicine  
 and Dentistry

North Carolina, University of  
 Mississippi, University of  
 Florida, University of  
 Louisiana State University  
 Texas, University of  
 Michigan, University of  
 Chicago Medical  
 Illinois, University of  
 State University of Iowa  
 Creighton University  
 St. Louis University  
 Southern California, University of  
 California, University of (Los  
 Angeles)  
 California, University of (San  
 Francisco)  
 Washington, University of  
 Missouri, University of  
 Colorado, University of  
 Medical Evangelists  
 Utah, University of  
 Stanford University  
 Oregon University

Indiana, University of

\* \* \* \* \*

# THE NAVY'S TRAINING PROGRAMS FOR UNDERGRADUATE AND GRADUATE MEDICAL STUDENTS

PROGRAM	DURATION	ELIGIBILITY TO APPLY	WHEN TO APPLY	MAKE APPLICATION
Ensign 1995 (Medical USNR)	From appointment to graduation from medical school	Medical students who have been accepted for enrollment at approved American and certain medical schools in Canada or are in attendance prior to commencement of the senior year	When accepted for enrollment in an approved medical school and before commencing final year	Nearest ONOP Main Recruiting Station, Naval Hospital, Naval Reserve Training Center or College where a NROTC unit exists
Research Clerkship Training (at Naval Medical Research Activities)	Up to 60-days active duty training with pay performed during summer vacation from medical school	Ensign 1995 medical officers who will have completed at least their first year of medical school	Between Feb and May each year	Naval district Commandant where applicant's records are maintained
Clinical Clerkship Training (at Naval Teaching Hospitals)	Same as for Research	Ensign 1995 medical officers who will have completed at least their second year of medical school	Same as above	Same as above
Midshipmen Cruise Training (on board cruising naval vessel)	Duration of cruise (30-45 days)	Ensign 1995 medical officers who have completed at least their second year of medical school with priority being given to those who will have completed their third year	Same as above	Same as above
Senior Medical Student (at civilian medical schools under instruction)	While in attendance during Senior academic year	Junior students who are or agree to accept Ensign 1995 (Medical) Commission	1 Jul to 15 Dec after completion of Sophomore year	Same as Ensign 1995 (Medical) Program
Naval Internships (at Naval Teaching Hospitals)	12 months-rotating in type	Senior Medical Student expected to graduate	Between 1 Sep and 1 Dec each year	Same as Ensign 1995 (Medical) Program
Residency Training (at certain of the Naval Teaching Hospitals)	One, two, three, or four years	Regular and Reserve medical officers on active duty	Prior to 1 Jan each year	Chief, Bureau of Medicine and Surgery by letter



## AVIATION MEDICINE DIVISION



### Aviation Medicine Section of the Bureau of Medicine and Surgery

Foreword: In order to inform aviation operational and station activities of the functional organization and responsibility of Code 5, the Assistant Chief of the Bureau of Medicine and Surgery for Aviation and Operational Medicine, the following informal description of the various subdivisions is briefly given. It is hoped that this information will permit an insight into the method of handling aviation medicine problems and policies in the Bureau of Medicine and Surgery. It is to be noted that different codes are assigned specific areas of responsibility; these officers will render any assistance that might be required of the Bureau concerning aviation medicine.

Code 5, Assistant Chief of Bureau for Aviation and Operational Medicine, is the senior position in the Aviation Medicine Division. He is responsible to the Surgeon General for the projection of BuMed policy control in aviation medicine matters. In this manner, he coordinates and correlates all phases of the program relating to aviation medicine.

Code 53, Director of the Aviation Medicine Division. This division studies, evaluates, and advises the medical needs, policies, standards, practices, and training procedures relating to naval aviation medicine, and in general, administers the entire aviation medicine program. In his capacity as a technical advisor in aeromedical matters to BuAer and CNO, closer liaison is maintained by membership on the Flight Status Selection Board, the Advisory Council for Aviation Medicine, and the CNO Aviation Safety Council. Close liaison with civil medical groups is maintained through membership on the Board of Military Medicine (Navy), and in the Military Medicine Section of the American Medical Association. This division also is responsible for the aviation medicine personnel section and maintains administrative cognizance over the training, assignment, and employment of medical officers, flight nurses, and other technical specialists of the Medical Department assigned to aviation activities.

Code 536 acts as Head, Special Activities Branch, Division of Aviation Medicine, and is principally concerned with the direction and coordination of the Aviation Physiology Training Program in the Navy. This program, for the most part, is carried out in the field and consists of 13 low pressure chambers, 14 ejection seat trainers, 12 two- and three-dimensional night vision trainers, and two special pressure suit indoctrination units, located at NAS Norfolk, Va., for the Atlantic Fleet and at NAS North Island, San Diego, Calif., for the Pacific Fleet.

It is not only necessary that standard syllabi be prepared, but also that liaison be maintained with CNO in producing necessary operational instruction and directives, such as OpNav Instruction 3740.3A and BuMed Instruction 3740.1. Likewise, this office maintains close liaison with BuAer and CNO in the entire program of training and use of personal airborne equipment and survival gear.

In the development of new personal airborne equipment, advisory assistance is rendered to the Navy's experimental laboratories; i. e., Aviation Medical Acceleration Laboratory, Johnsville, Pa.; Air Crew Equipment Laboratory, Philadelphia, Pa.; Navy Parachute Unit, Naval Auxiliary Air Station, El Centro, Calif.; Naval School of Aviation Medicine, Pensacola, Fla.; and Aero Medical Branch, Service Test, Naval Air Test Center, Patuxent River, Md.

The responsibility of this office is to recruit, train, and detail the designated Applied Aviation Physiologists not only to operational billets, but also to the laboratories mentioned above. In conjunction with this program, the assignment of personnel to hazardous duty incentive pay as inside instructors/observers and human subjects in acceleration studies, both enlisted (AVT's and PR's) and officers, is administered. Recently, this office represented the Navy at hearings before the House and Senate Armed Services Committees in the establishment of a new category of hazardous duty experimental personnel—human subjects in thermal stress experiments. These subjects will be used in both the thermal stress of reentry into the heavier atmosphere and those of extreme cold at altitude.

Close liaison is maintained with the field activities, CNO, and the Training Device Center in the preparation, production, allocation, and maintenance of physiology instruction manuals, training aids and devices, and the introduction of new and the modification of existing training aids and devices. In conjunction with this program, this Branch assists in conducting the Training Devicemen School at the Naval School of Aviation Medicine at the Naval Aviation Medical Center, Pensacola.

Close liaison is also maintained with the carrier desk at the Bureau of Ships in matters having to do with hospital spaces aboard aircraft carriers. It also acts as advisor to the Commandant, U. S. Marine Corps in Marine aviation matters via Director, Amphibious U. S. Marine Corps Field Medicine Division. New concepts in this field are coordinated annually



at the Aircraft Wing Medical Conference held each year at this Bureau. Further promulgation is accomplished by field visits and lectures at the Marine Corps Schools at Quantico, Va.

All aeromedical literature is reviewed in this office and the Aviation Medicine Section of the Navy Medical News Letter is prepared. This office also maintains liaison with the Civil Aeronautics Administration and has published BuMed Instruction 6120.11A for field use. Another instruction prepared recently was BuMed Instruction 6100.3 and implementing forms, NavMed-1380 and NavMed-1381. These forms are not only valuable to the Bureau, but are also of great statistical value to the Flight Safety Program at the Naval Aviation Safety Center, Norfolk, and CNO (Op-57).

Code 535, Aviation Physical Qualifications Branch, Division of Aviation Medicine. The functions of this branch are to study, evaluate, and determine physical requirements for flying and special physical requirements for air and ground crew personnel of the naval air arm. This office also reviews and initiates action on reports of physical examinations of naval aviation personnel to determine their physical fitness and aeronautical adaptability for duty involving the actual control of aircraft, flying as a crew member not in control of aircraft, or aviation ground duties. In reviewing medical records for appropriate action on flight physical examinations, background medical history is furnished the examining flight surgeons when needed. The additional medical history aids the medical examiner in the field in studying cases. It also aids the examiner at times in instituting measures which might prevent the temporary or permanent loss of qualified aviation personnel.

Another mission of this office is to maintain or recommend for modification, as may be indicated, the established physical standards for all categories of aviation personnel in order that only those individuals who are fully qualified in all respects are accepted for aviation training and to remove from aviation duty those individuals who are no longer qualified for such duty due to temporary or permanent disqualifying defects. This policy helps to maintain the air arm of the Navy as an efficient combat-ready organization manned by fully qualified personnel.

The medical officer of this branch is a member of the Advisory Council for Aviation Medicine which consists of officers from the Aviation Medicine Division. This council takes final action on controversial medical cases where multi-medical opinions are considered appropriate. Close liaison is maintained with the Bureau of Naval Personnel and the field by membership on the following boards: Naval Aviators Disposition Board; Promotion and Integration Board on Aviation Personnel; Flight Status Selection Board; and Formal Board of Senior Flight Surgeons and/or Aviation Medical Examiners convened by the Chief of Naval Personnel.

Code 535 is a central point to which naval medical personnel from the field and/or individual examinees may come or telephone for specific

information on controversial or unusual cases. Research projects regarding aviation physical qualifications are continually in progress. The current ones are:

- a. With reference to height, weight, service group and age
- b. With reference to physical qualifications as related to aircraft accidents
- c. Statistics of defects causing disqualification from the flight training program

The Code 535 medical officer periodically goes to the Naval School of Aviation Medicine, Pensacola, to lecture to the student flight surgeon classes on physical qualifications, physical standards, and related subjects. He represents the Division of Aviation Medicine on Ad Hoc committees related to physical qualifications and represents the Bureau of Medicine and Surgery on inter-service conferences relating to physical qualifications.

Code 5312 acts principally as a technical advisor to two divisions in the Office of the Chief of Naval Operations: Aviation Safety Division (Op-57) and Aviation Training Division (Op-56). The officer further maintains direct liaison with the Naval Aviation Safety Center, other officers in the Departments of the Navy and the Air Force, and civilian agencies on matters relating to aviation safety. Code 5312 is also designated Op-575 in the Office of the Chief of Naval Operations. This office reviews and studies all Medical Officers Reports of Aircraft Accidents, Incidents, and Forced Landings as well as special Aircraft Accident Reports and Investigations. The purpose of this review is to assist the Director, Aviation Safety Division, in planning and supervising a program which is designed to reduce the number and severity of aircraft accidents attributed to errors of flight, maintenance, and supervisory personnel. He prepares directives in support of this program and coordinates such directives with the Bureau of Medicine and Surgery and the Bureau of Aeronautics for the purpose of correcting pilot-factor accident causes, improving the utilization of airborne equipment, and providing for adequate training in aeromedical areas. In the recent past, the following OpNav Instructions have been his concern; 3740.7 (Fitness of Flying Personnel); and medical portions of 3750.6B (Navy's Aircraft Accident, Incident, and Forced Landing Reporting Procedure).

Code 5312 is one of two Navy members of the Joint Committee on Aviation Pathology. This committee has been established by a Department of Defense Directive and is concerned with the collection and study of information on the correlation between pathological evidence and the causative factors of aircraft accidents. BuMed Instruction 6510.6 (Aviation Pathology Program), explaining the work of this committee in detail and the Navy's participation, is currently in preparation.

As Op-575, he assists in the preparation of the Navy's annual report to the Society of Actuaries, being a compilation of aircraft accident data



for the use of insurance companies. For the past year, he has been project liaison officer for a Training Device Center study entitled "Human Engineering Assistance in Aviation Medical Safety Training." Publication of this report, which will take the form, in part, of a Handbook for Flight Surgeons, is expected shortly.

In the recent past, Code 5312 has made presentations before the following groups in the interest of aeromedicine and flight safety: The Chief of Naval Operations Aviation Safety Council; the Preventive Medicine Section of the American Medical Association; the Institute of the Aeronautical Sciences; and the Aero Medical Association. He has assisted in periodic presentations before the School of Aviation Medicine and the Marine Corps Schools.

At the request of the United States Coast Guard, he assisted in the preparation of the medical portions of a joint Coast Guard-Air Force-Navy publication (OpNav Instruction 3730.4, Aircraft Emergency Procedures Over Water). In conjunction with the Civil Aeronautics Administration he assisted in "Operation Ditch," the simulated escape procedures for a ditch transport aircraft at sea.

In his capacity as technical advisor to the Aviation Training Division, CNO, he assists in the preparation of aviation flight and ground training literature, publications, and films to meet training requirements. He takes part in the development and evaluation of training devices and training aids to meet the requirements of naval aviation. He assists this Division in its work with the Bureau of Naval Personnel in the job-coding of certain aviation ratings working in the personal airborne equipment field. He is also consulted in a medical advisory capacity by Naval Aviation News.

The work of this office is directly concerned with aeromedical problems in the fleet related to aviation safety. Such work is largely administrative, consultative, and advisory in nature. Command responsibility in the field is indispensable to safe and effective operations. Similarly, the individual flight surgeon is responsible for the conduct of a flight safety and training program in his own group or squadron. One of the principal factors in the exercise of the flight surgeon's responsibilities is the ease of communication between his unit and the chain of command. The Medical Officers Report of an Accident is the most direct line for passing on recommendations relating to the practice of aviation medicine. Flight surgeons are encouraged to use this medium for exchanging ideas to the fullest degree. In the interest of aviation safety and fleet effectiveness, flight surgeons are reminded that no investigation of a fatal accident is to be considered complete without an autopsy and a thorough study of the human factors involved.

Code 537, the Aviation Psychology Branch of the Aviation Medicine Division, is responsible for the establishment of operating procedures and

plans for the Aviation Psychology program in which trained psychologists are routinely working in these areas as they affect the performance of aircraft pilots in the fleet.

Assuming that the pilot is physically and aeronautically adapted for flying, the success with which he performs his job depends upon his basic aptitudes, his training, and the degree to which the job itself is suited to his capabilities. The Navy's specialist in these areas of aptitude measurement, training methods, and fitting-the-job-to-the-pilot is the Aviation Psychologist.

The role of the aviation psychologists in the selection of men for flight training is generally known. The employment of psychological selection tests for this purpose has been routine since 1941, and administration of the tests has centered in the Aviation Psychology Branch of BuMed since that time. A more recent development has been the use of these tests in conjunction with training grades to tag in advance those trainees who will probably fail to measure up to subsequent training requirements in Naval Air Training Command or to operational requirements in the fleet. As a selection device, the psychological selection tests are estimated to have saved the Navy several million dollars annually by eliminating in advance many of those who would fail in training. Now, through use of these test predictions, progress grades are routinely calculated on all student pilots and used by student-pilot disposition boards in determining whether a student should be permitted to continue in training after he has displayed inadequate performance. Results to date indicate a further substantial saving to the Navy through early elimination of those with a high probability of failure later on. There is also evidence that this system of elimination will be reflected in terms of better performance in the fleet and reduction of aircraft accidents.

More recently, the work of the Aviation Psychologists toward the improvement of the training of the naval aviator has also been gaining recognition. On the Headquarters staff of the Chief of Naval Air Training, and on the staffs of each of the functional commands, these officers advise on training problems, initiate training research programs, and promote implementation of research findings as new training techniques are revealed. The work of these men is supported by the work of the Aviation Psychology Laboratory at the Naval Aviation Medical Center, Pensacola, Fla., where approximately two dozen psychologists—uniformed, civil service, and contract personnel—combine their efforts toward increasing the efficiency of both the training and the fleet performance of the naval aviator.

A further use of the talents of Aviation Psychologists is now developing as a result of the increasing consideration being given to human factors in the design of aircraft and equipment. The training of many of these officers makes them ideally suited to evaluate and advise upon the design of equipment from the point of view of adapting it to the performance capabilities and limitations of the pilot. One is assigned to display evaluation and



instrument arrangement in the Instruments Branch of the Airborne Equipment Division of the Bureau of Aeronautics. Three of these scientists from the Aviation Medicine Division of the Naval Medical Research Institute, Bethesda, Md., have been called to assist with human engineering problems at the Missile Test Center at Point Mugu, Calif. Others, both civilian and in uniform, are doing similar jobs at the Aviation Medical Acceleration Laboratory, the Air Crew Equipment Laboratory, and the Naval Aviation Safety Center.

While Code 537 recognizes the importance of the selection test program and the correlated use of the tests in predicting the efficiency of the performance of aviation pilot trainees, this program is seen as relatively stabilized for the present. In view of the current manpower shortage and restriction on new billets, present plans call for reassignment of personnel as feasible to fill, or attempt to fill, the tremendously growing need for psychologists with appropriate training to operational type billets demanding specialized training in psychophysical measurement techniques and human engineering know-how. As a result, one Aviation Psychologist is currently under orders to the Naval Air Test Center, and other transfers to major aviation fleet commands are under consideration aimed toward strengthening the operational contribution of the Aviation Psychologists.

Code 531 serves as Head of the Aviation Medical Technical Branch and is assigned as technical consultant to the Air Warfare Division (Op-55) of the Deputy Chief of Naval Operations and also to the Systems Division (SY) of the Bureau of Aeronautics.

This officer makes recommendations on the development, testing, evaluation, introduction, and use of new aeronautical and personnel equipment; coordinates the determination and the physiological and human engineering aspects of military requirements for aircraft and equipment; and maintains liaison between the Bureau of Medicine and Surgery and CNO (Op-55) and BuAer (SY). In performing this function, this officer conducts background research and investigation and prepares operational requirements on aeronautical, aviation personnel, survival and safety equipment. Remedial action is recommended and coordinated in connection with deficiencies in aeronautical equipment and aviation personnel equipment as revealed by fleet operations. Research programs are reviewed and recommendations are made where necessary to obtain physiological information pertinent to the development of aviation equipment. This officer reviews and/or prepares reports, directives, and instructions issued by the Air Warfare and Systems Divisions on physiological matters. The progress of military requirements are discussed with cognizant officers in the Bureau of Medicine and Surgery, such as the development of equipment, future requirements for physiological research and testing procedures indicating, in detail, information, data and physiological criteria needed for these requirements. In addition, this officer acts as advisor to, and is a member



of, the Cockpit Coordinating Committee and maintains liaison with Navy, Air Force, and appropriate civilian research laboratories. At present, this officer is the Navy member of the Aero-Medical Panel of the Advisory Group for Aeronautical Research and Development of NATO.

The Systems Division of BuAer correlates, reviews, and takes necessary action to insure integrated action of the various other divisions of BuAer so that a satisfactory weapons system, in all respects, is produced. In this regard, he attends mock-up boards and acts as advisor in the determination of the proper course of action on compatibilities which occasionally appear on a given weapons system. A good example of the work performed by this officer in the Air Warfare Division is the current revision of operational requirements for aviators equipment, escape, and survival devices for future air warfare systems. Likewise, in the Systems Division of BuAer, this officer works with the policy decisions on the present and future development and utilization of pressure garment equipment for naval aviators.

Code 5311 acts as the Aeromedical Technical Advisor and Assistant to the Director, Airborne Equipment Division, Bureau of Aeronautics, on the research and development of aircrew personnel equipment particularly pertaining to the psychological and physiological factors and tolerances. In this regard, this officer works directly with the engineers in this Division on the projects and contracts for the development of aircrew equipment, such as protective helmets, goggles, visors, oxygen equipment, noise attenuating equipment, life vests, flight clothing, parachutes, escape devices, anti-exposure suits, anti-blackout suits, pressure suits, life rafts, survival equipment, et cetera.

Following the establishment by the Chief of Naval Operations of an operational requirement, the basic physiological data upon which gear is based is reviewed for adequacy and detail. Frequently, before development can begin, research projects must be established at the Air Crew Equipment Laboratory, the Aviation Medical Acceleration Laboratory, the Naval Air Test Center, the Naval Parachute Unit, the School of Aviation Medicine, and/or contracts with universities or private industry to develop data on tolerances, feasibility studies, and methods of approach. Following the development of necessary criteria and physiological data, a procurement request is issued to interested and qualified manufacturers requesting bids and proposals for the development of the necessary article which this office assists in monitoring.

Code 5311 is also the Bureau of Aeronautics member on the National Research Council Committee on Vision, the Armed Forces Committee on Hearing and Bio-Acoustics, and the BuAer Cockpit Development Panel. Conferences are held to disseminate and coordinate research requirements with the Research Division of BuMed and the Office of Naval Research.



Requests for authority for non-Government conference travel from medical personnel assigned to BuAer-managed activities are routed to this officer for comment and justification. Similarly, personnel requests and shore station building requests are routed for comment to this office.

\* \* \* \* \*

### Pressure Suit Reports

Two recent experiences with the Navy Modified Partial Pressure Suit and the new prototype Two-Pound Full Pressure Suit are presented in the following statements as given by the pilots concerned:

#### Statement No. 1

"My mission on the afternoon of 24 July 1957 was to collect zoom-climb data for the F8U project. A normal afterburner take-off and climb was made to 45,000 feet. Two zoom-climbs were made to approximately 54,000 feet on a southeasterly course from the air station. A reversal to a northeasterly course which paralleled the coast, was made approximately seventy miles south of the air station. Two more zoom-climbs were made on this course. On the second climb immediately following a normal manual afterburner shutdown, a loud explosion occurred. The electrical power was lost immediately and the cabin pressure started dropping off. I rolled over into a 60 degree dive. The object in my immediate descent was to eliminate the possibility of the automatic pressurizing of my partial pressure suit. I leveled the aircraft at 35,000 feet and released my emergency air-driven generator (Marquardt Unit). The UHF radio was turned to the "off" position and then the emergency generator switch was pushed forward to the "on" position. Electrical power was gained immediately. At this time, I confirmed the flame-out and put the throttle around the horn into the cut-off position. Slowing the aircraft to 220 knots, I set up a gliding descent toward the Naval Air Station, Atlantic City, N. J. My position at this time was off shore from New York City.

My first relight attempt was made passing through 29,000 feet. On this first attempt to relight the engine, windmilling speed was approximately 20% and airspeed 210 knots. The tail pipe temperature remained constant at approximately 300 degrees and the RPM remained constant at 20%. No change in tail pipe temperature was noted at any time during the descent. The same relight procedure was repeated three more times with the throttle retarded to idle cut-off between each attempt to relight. At least 30 seconds was allowed to clear the engine between each attempted relight. The emergency fuel control was turned on for a fifth attempt with the same negative results. During my descent and after passing 27,000 feet, the radios were turned on and the IFF set to the emergency



position. I made several attempts to contact the Naval Air Station, Atlantic City. I received no side tones from my transmitter during these attempts. Assuming radio failure, I made no further attempt.

Having been unsuccessful in contacting any radio station, I elected to proceed to the unpopulated forest area southeast of Lakehurst for a bailout. I observed my position to be approximately 40 miles northeast of Lakehurst Naval Air Station at 16,000 feet. Realizing that ejection was imminent, I removed my face plate from the Type C-1AM partial pressure suit and disconnected all suit connections from the aircraft. I also removed the MA-2 air bottle from my left knee and placed this unit on the aft starboard panel of the cockpit.

At 6,000 feet, after passing through a broken to scattered overcast, I trimmed nose down and full right aileron. The face curtain was pulled and ejection was normal with some tumbling. The automatic lap belt fired, separating me from the seat; and after four to five seconds, with no chute blossoming out above, I pulled the rip cord (D-ring) releasing the parachute. The parachute opened with a minimum of shock. I immediately observed my F8U in a diving spiral with large amounts of orange flame billowing from the tail section. The aircraft continued to burn until the crash occurred. The aircraft struck the ground in what appeared to be a 60-degree angle. During my parachute descent, I released my life raft and leg straps. The parachute caught in a pine tree with which I collided upon landing. No difficulty was experienced in releasing the integrated harness, but considerable effort was experienced in releasing the helmet and head piece from the partial pressure suit."

#### Statement No. 2

"On 25 July 1957 at 1212, I took off in an F8U-1 in the lightweight two-pound full pressure suit. The object of the flight was to obtain zoom-climb performance data and also to evaluate this type of full pressure suit. I made one zoom-climb and then proceeded to make a second one. Shortly after reaching maximum altitude while accelerating and descending slightly, I attempted to relight my afterburner which caused my engine to flame out. At this time I was slightly above 52,000 feet. Shortly thereafter I lost my electrical power and as my cabin pressurization was lost, I felt my full pressure suit inflate. I believe this occurred at about 50,000 feet. I turned to a direction which I thought to be the best to avoid populated areas, should it be necessary to abandon the aircraft, and set up a speed which would utilize my altitude to give my maximum range. I was able to turn on my emergency IFF, which is aftermost on the right console, with no trouble.

Once below 35,000 feet, a relight was obtained using normal air-start procedures. Once the engine was started at about 30,000 feet and cabin pressure returned to normal, the suit was felt to deflate. I returned to NAS Atlantic City and landed.



The features of the suit which will be discussed are its comfort, its visibility, and mobility uninflated, and its visibility and mobility inflated.

The suit was donned at 0915 minus helmet and gloves, but due to radio difficulties, the aircraft was not manned until about 1155. While waiting to man the plane, the suit was ventilated with compressed air occasionally when it began to feel too warm. Since the ambient air temperature was about 78° F., this was necessary only for about 10 minutes each hour. Meanwhile, I walked about the squadron spaces checking on routine work and occasionally drinking a cup of coffee. Once the aircraft was ready, I went to the flight line and put on the torso harness and attached backpack and climbed into the cockpit without assistance. After turning up the engine and making routine checks, I donned the helmet and gloves, taxied to the runway, and took off. On return after landing and removing the helmet and gloves, I encountered some delays in returning to the ready room including a hike of about 1/8 mile with the result that I did not get out of the suit until about 1400. The vent garment was fairly well saturated with perspiration, but at no time did I feel that the suit was too much more uncomfortable than conventional flight gear in warm weather.

In the uninflated condition, the visibility afforded by the suit was far better than I had anticipated. On a previous flight in a partial pressure suit, I was agreeably surprised at the good visibility it permits when uninflated. Since the backpack of the full pressure suit moves the pilot forward, I expected to have difficulty in seeing the switches on the after parts of the consoles. I found that I could see and reach all necessary switches. Prior to experiencing the flame-out, I tested the mobility and visibility permitted by the helmet. I found that by using simple techniques I was able to see aft as far as the after edge of the canopy on both sides. Movement to the extreme left was slightly inhibited by the "D" ring of the parachute which rested on top of my left shoulder. Bulk of straps and other items at the shoulders has an adverse effect on mobility of the helmet in this type of suit because it restricts the movement of the neck ring.

When the suit inflated, it was something of a surprise because I did not expect the cabin pressure to be lost as soon as it was. The inflation of the suit was not an alarming experience, however, because the suit controller seemed to take over gradually as the cabin pressure decreased. The inflation of the suit caused a slight decrease in mobility. As near as I can estimate, it felt about the same as when the suit is pumped up to one pound on the ground. Control of the aircraft was not hampered by the suit and I was able to reach all necessary switches. I did not test the limits of my field of vision while in the inflated condition, but I felt that it was completely adequate. Knowing that the suit was pressurized, I felt no urgency to get down to lower altitudes for



safety. Since I was distant from the ocean, I decided to use my altitude to give me additional range so as to be able to ditch the aircraft, if necessary, at sea rather than in an inhabited area. I set up a rate of descent which would give me maximum range rather than one which would quickly get me down to altitudes where conventional high altitude equipment would be adequate.

My over-all impression of this suit as compared with the partial pressure suit is that it has very little less mobility, visibility, and comfort in the uninflated condition. In the inflated condition, it is much more comfortable and affords much more mobility and visibility than an inflated partial pressure suit. "

The printing of this publication was approved by the Director of the Bureau of the Budget, 16 May 1955.

POSTAGE AND FEES PAID

NAVY DEPARTMENT

DEPARTMENT OF THE NAVY

U. S. NAVAL MEDICAL SCHOOL

NATIONAL NAVAL MEDICAL CENTER

BETHESDA 14, MARYLAND

OFFICIAL BUSINESS

Permit No. 1048